

**NORTHROP GRUMMAN**

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June 27, 1997  
Letter No. CYRO-RADAR-CDRL-A0018

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Office of Naval Research, ONR-31  
Attn: BAA-ACI, Room 720  
800 North Quincy Street  
Arlington, VA 22217-5660

Attention: Glynis Fisher, ONR 251, Contract Negotiator

Subject: Monthly Status Report, CDRL 0001, Data Item A001, CRYORADAR ADC Feasibility Demonstration Program

References: (A) Contract No. N00014-95-C-0195  
(B) Westinghouse G.O. 47862

Enclosure: Monthly Status Report, CDRL 0001, Data Item A001, CRYORADAR ADC Feasibility Demonstration Program, one (1) copy

Dear Ms. Fisher:

We are pleased to submit the Monthly Program Status Report, CDRL 0001AA, Data Item A001 in accordance with the Referenced (A) contract requirements. This report covers the period ending 31 May 1997. The Program Funding Status Report is attached as well.

Please contact the undersigned with any questions. Technical questions may be directed to the Program Manager, Mr. Hal Ball (410) 765-0410.

Sincerely,  
NORTHROP GRUMMAN CORPORATION



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cc: ACO, C. Johnson, MS-V-10A, one (1) copy  
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INFO QUALITY IMPROVED 1

**CRYORADAR™ ADC Feasibility Demonstration Program**  
**Contract No. N00014-95-C-0195**  
**Status Report for Period Ending 31 May 1997**

Meetings and telephone conference calls were held in May with STC, Conductus, Oregon State University, and UCLA. Several contractor personnel attended and participated in the HTS Collaboration meeting with TRW, Conductus, and the government sponsors on 12 and 13 May in Washington D.C.

As of 11 June, 1997, the CRYORADAR™ ADC Feasibility Demonstration Program has invoiced \$2,111,568. Total estimated spending as of 25 May, 1997, is \$2,113,900. Program Spending Status and Program Funding Status charts are attached.

The Program Schedule Status is attached and reflects progress and task activity on the program. The program is approximately one month behind the original schedule due to the 1996 stop work period.

Recently, Program Management has continued to focus on the re-evaluation of the program scope with the ONR Program Manager. Tasks and associated costs of the baseline program plan are being reviewed in the context of a potential funding reduction, and optimum approaches are being explored to complete this phase of the program in mid 1998 in preparation of the next Option Phase which is part of the current contract. Preliminary correspondence with the customer has occurred to exchange background information and put forth potential scenarios.

**System Engineering**

The System Engineering activity has continued during May with acquisition of the removable disk that will be used to collect and transfer data from the Demo 1 setup to System Engineering for further processing and analysis.

**HTS Component Fab & Test - Conductus**

This program's support of the development of HTS JJ technology at Conductus has lapsed due to a reduction in funding.

**Superconducting Modulator/Demux**

Testing of chips has continued. Two types of differential output circuits have been tested at low speed. One type, based on magnetic coupling has been tested with some success. The second type, based on three junction interferometers, has been subject to undesired flux storage and has been less successful. High speed testing is now underway.

Modifications to the Demo 1 modulator are currently being simulated to improve dynamic range. A new mask design is planned for release at the end of June.

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A software modification will allow the collection of up to 1 Mbit of raw data from the Demo 1 test setup, permitting a more precise determination of the signal to noise performance of the modulator.

### **Digital Filter - OSU**

Work on the Digital Filter task has continued at Oregon State University. A. Pershall of Northrop Grumman has had ongoing dialog with the OSU technical folks. The following input was provided by OSU:

Current estimate on the decimation filter size and power (unchanged from last report): 2 chips (HP 0.5 um fab), power<5W.

1. A 2nd test chip was taped out - Another test chip was sent to fabrication last month. The purpose of the chip is to test those adders and the ECL input & output pads.
2. Discussed some possible system level revision with Andy Pershall - Andy is looking at some parallel modulator structure. It is possible to parallel some smaller fashions of the decimator to achieve the same performance goals of Demo 3, provided that the modulator is running at the same speed (10.24GHz).
3. Dr. Lu will take over the layout work in the summer - As the architectural work is essentially complete, the layout work is all that remains. Shih-Lien will do the first stage decimator this summer. Low-speed testing will be done at OSU, but we expect that at-speed testing will be done at Northrop-Grumman.
4. Dr. Schreier will leave OSU this summer - Richard intends to take a "leave of absence" in lieu of a sabbatical. He has accepted a position with Analog Devices and will depart OSU shortly after June 13. Since the architectural work is mostly done, his leaving should not affect the progress of the project too much. We fully expect that Northrop-Grumman will be satisfied with the deliverables which result from this sub-contract.
5. Haiqing Lin is leaving for his summer internship with AMD - Haiqing will start his summer intern with Advanced Micro Devices Inc. this June. He will keep contact with Prof. Schreier and Prof. Lu on the NG decimation project. He will also be available via his current email. He intends to return to OSU by the end of Sept. and will continue his work on this project.

### **Interface Amplifier / Support Electronics, Packaging, & Thermal**

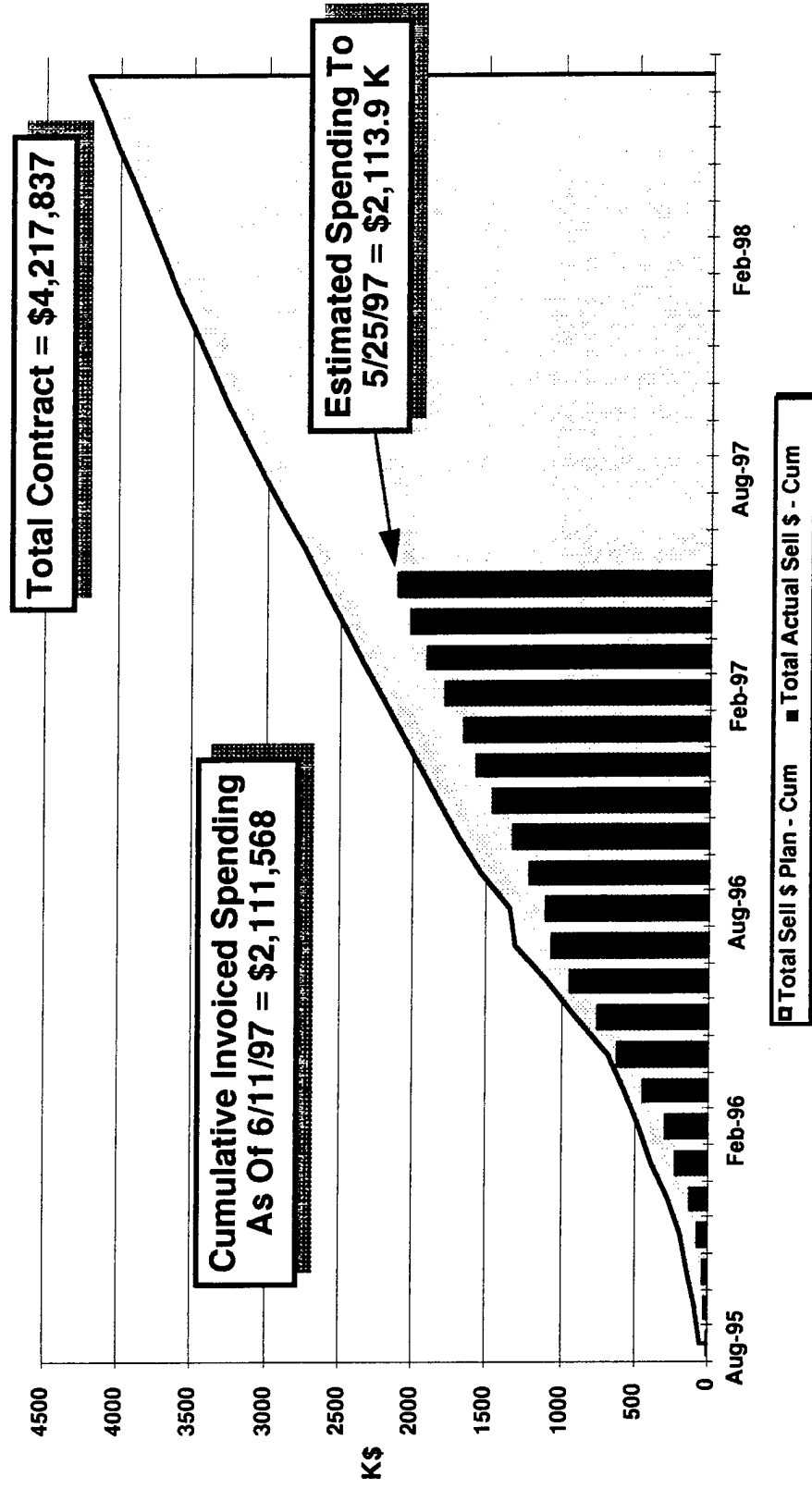
The focus of this task in May was to provide followup support for Demo 1 which was held in April at STC in Pittsburgh. G. Kolnowski completed some software modifications and delivered them to the Demo 1 setup at STC to provide additional capabilities in the digital filter simulator that were identified during Demo 1.

J. Colgan has been supporting the replanning activities mentioned above. Subsequent activity has focused on the re-evaluation of the program scope with program management. Tasks and associated costs of the baseline program plan are being reviewed in the context of a potential funding reduction and optimum

approaches are being explored to complete this phase of the program in mid 1998. Communication with Oregon State University has taken place to develop alternate, but evolutionary, applications of their digital filter, and advice has been sought concerning the delta-sigma performance impacts associated with the potential changes. We have Conductus on hold with respect to the purchase of their modified dual stage package which was planned originally for Demo 3.

Status Date: 5/31/97	1995	1996	1997	1998
<b>Program Task</b>	A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J			
Program Management - ESCO	Kickoff ▲ IPR ▲	IPR ▲	IPR ▲	IPR ▲
System Engineering - BWI				
HTS Component Fab & Test - Cond		JJ Process ▲	Multilayer Process ▲	
Modulator Design - STC		Digital Amplifier ▲	18 Bt, 20 MHz ▲	
Modulator Circuit Verification - STC		4X 2X Amplifier ▲		18 Bt, 20 MHz ▲
DEMUX Design - STC		10 GHz, 1:4 ▲	10 GHz, 1:2 ▲	10 GHz, 1:8 ▲
DEMUX Verification - STC				
Demo 1 COTS Interface Amp Design		400 MHz ▲	700 MHz ▲	
Interface Amplifier Design - BWI		250 MHz ▲	300 MHz ▲	
Interface Amplifier Fab & Test - BWI				
Digital Filter Design - OSU				
Digital Filter Fab & Test - OSU				
Digital Filter Fab & Test - BWI				
Support/Thermal Design - BWI				
Support/Thermal Fab & Test - BWI			Demo 1 ▲	Demo 2 ▲ Demo 3 ▲

# Program Spending Status - 5/25/97



# Program Funding Status - 5/25/97

